

REMARKS

The present application includes claims 1-23. By this Amendment, claims 1, 9, and 14 have been amended. Claims 2-3, 10, and 15-16 have been cancelled. No new matter has been added by these amendments.

Claims 1-3, 7, and 9-11 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,984,869 (“Chiao ‘869”).

Claims 14-23 were rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,375,618 (“Chiao ‘618”).

Claims 4, 8, and 12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Chiao ‘869 in view of U.S. Patent No. 6,213,947 (“Phillips”).

Claims 5, 6, and 13 were rejected under 35 U.S.C. 103(a) as being unpatentable over Chiao ‘869.

The Applicant first turns to the amendments to the claims. Independent claims 1, 9, and 14 have been amended to recite encoding ultrasound beams using complementary Golay codes and transmitting the ultrasound beams on spatially adjacent paths. That is, each ultrasound beam on a particular path is encoded using a single Golay code and beams encoded with complementary Golay codes are transmitted on spatially adjacent paths. In addition, independent claims 1, 9, and 14 have been amended to recite processing echo signals from such encoded ultrasound beams to form an ultrasound line.

Dependent claims 2-3, 10, and 15-16, which recited limitations similar to some of those now recited in amended claims 1, 9, and 14, have been cancelled. The Applicant expressly

reserves the right to pursue the subject matter of the cancelled claims, and any other patentable subject matter disclosed by the application, in a continuing application.

The Applicant next turns to the rejection of claims 1-3, 7, and 9-11 under 35 U.S.C. 102(b) as being anticipated by Chiao '869. The Applicant respectfully submits that Chiao '869 does not teach or suggest the entirety of the limitations recited in the pending claims for at least the reasons discussed below.

As discussed in the prior Amendment filed March 7, 2007, Chiao '869 was referenced in the background section of the present application and relates to use of a pair of Golay codes used in two data acquisitions. In prior art systems, such as the one discussed in Chiao '869, Golay coded excitation is done in two acquisitions with a first code in a first acquisition and a second code in a second acquisition. For example, Chiao '869 states at col. 5, lines 12-15 that "[a] pair of Golay-encoded base sequences are transmitted consecutively on each beam, i.e., during first and second firings having the same focal position." *See also* col. 2, lines 32-63 and col. 3, lines 13-20. That is, two beams are transmitted for a particular beam path. Using two codes in two acquisitions doubles a time to acquire ultrasound data. Double transmission degrades a frame rate of an imaging system. For additional explanation, the Applicant respectfully draws the Examiner's attention to Figure 3 and paragraphs [34] and [35] of the present application.

As discussed above, amended independent claims 1 and 9 recite encoding ultrasound beams using complementary Golay codes and transmitting the ultrasound beams on spatially adjacent paths, rather than transmitting two beams on the same path to acquire ultrasound data as discussed by Chiao '869. In addition, Chiao '869 makes no mention of processing echo signals

from such encoded ultrasound beams on spatially adjacent paths to form an ultrasound line as recited in claims 1 and 9.

Therefore, the Applicant respectfully submits that amended independent claims 1 and 9 should be allowable over the cited art of record for at least the reasons discussed above.

Dependent claims 2-3 and 10 have been cancelled. Claims 7 and 11 depend from independent claims 1 and 9, respectively. The Applicant respectfully submits that because claims 1 and 9 should be allowed for at least the reasons discussed above, claims 7 and 11 should also be allowed.

The Applicant next turns to the rejection of claims 14-23 under 35 U.S.C. 102(b) as being anticipated by Chiao '618. The Applicant respectfully submits that Chiao '618 does not teach or suggest the entirety of the limitations recited in the pending claims for at least the reasons discussed below.

As previously discussed, the Abstract and col. 3, lines 30-37 of Chiao '618 discusses that transmit waveforms are phase encoded using a two-code pair for each transmit waveform. Chiao '618 states beginning at col. 8, line 64 that for two-transmit code, such as Golay codes, "the transducer elements are pulsed in accordance with a first coded sequence during a first transmit firing focused at a desired transmit focal position and in accordance with a second coded sequence during a second transmit firing focused at the same transmit focal position."

As discussed above, amended independent claim 14 recites encoding ultrasound beams using complementary Golay codes and transmitting the ultrasound beams on spatially adjacent paths, rather than transmitting two beams on the same path as discussed by Chiao '618. In

addition, Chiao '618 makes no mention of processing echo signals from such encoded ultrasound beams on spatially adjacent paths to form an ultrasound line as recited in claim 14.

Therefore, the Applicant respectfully submits that amended independent claim 14 should be allowable over the cited art of record for at least the reasons discussed above.

Dependent claims 15-16 have been cancelled. Claims 17-23 depend from independent claim 14. The Applicant respectfully submits that because claim 14 should be allowed for at least the reasons discussed above, claims 17-23 should also be allowed.

The Applicant next turns to the rejection of claims 4, 8, and 12 under 35 U.S.C. 103(a) as being unpatentable over Chiao '869 in view of Phillips. The Applicant respectfully submits that neither Chiao '869 nor Phillips, alone or in combination, teach or suggest the entirety of the limitations recited in the pending claims for at least the reasons discussed below.

As discussed beginning at col. 1, line 12, Phillips relates to systems and methods that utilize coded transmit pulses to enhance imaging characteristics, particularly in motion processing imaging modes. Phillips briefly mentions the use of Golay codes beginning at col. 15, line 37. More particularly, Phillips states that "a second complementary transmit firing, with the expected loss in frame rate, may be used to" address unacceptable range lobes. The two separate outputs resulting from the two transmit firings "can be added before display processing to help suppress the unwanted range lobes." Phillips then cites Golay codes as an example of such a complementary code. Phillips goes on to note at col. 16, lines 8-12 that the transmitted signals should be separated in time to minimize overlap, otherwise undesired terms would appear in the harmonic signals. Thus, Phillips use of Golay codes is similar to other prior art systems

such as those discussed above, involving firing two complementary-coded beams on the same beam path.

As discussed above, amended independent claims 1 and 9 recite encoding ultrasound beams using complementary Golay codes and transmitting the ultrasound beams on spatially adjacent paths, rather than transmitting two beams on the same path to acquire ultrasound data as discussed by Chiao '869 and Phillips. In addition, neither Chiao '869 nor Phillips, teach or suggest processing echo signals from such encoded ultrasound beams on spatially adjacent paths to form an ultrasound line as recited in claims 1 and 9.

Therefore, the Applicant respectfully submits that amended independent claims 1 and 9 should be allowable over the cited art of record for at least the reasons discussed above.

Claims 4, 8, and 12 depend from independent claims 1 and 9. The Applicant respectfully submits that because claims 1 and 9 should be allowed for at least the reasons discussed above, claims 4, 8, and 12 should also be allowed.

The Applicant next turns to the rejection of claims 5, 6, and 13 under 35 U.S.C. 103(a) as being unpatentable over Chiao '869. Chiao '869 fails to teach the entirety of the limitations recited in amended independent claims 1 and 9 for at least the reasons discussed above. Claims 5, 6, and 13 depend from independent claims 1 and 9. Therefore, the Applicant respectfully submits that because claims 1 and 9 should be allowed for at least the reasons discussed above, claims 5, 6, and 13 should also be allowed.

In addition, in the Office Action on pages 5-6, it appears that the Examiner is taking Official Notice in rejecting claims 5, 6, and 13. The Examiner has made statements that, because of the manner in which the statements are worded, could be interpreted as the Examiner asserting

Official Notice of the subject of the statements. If the Examiner is asserting Official Notice that the subject of the statements are common knowledge, the Applicant respectfully traverses the Examiner's assertions as further set forth below. Alternatively, if the Examiner's assertions are based on the personal knowledge of the Examiner, then under MPEP § 2144.03(C) and 37 C.F.R. § 1.104(d)(2), the Examiner's assertions must be supported by an affidavit from the Examiner.

According to MPEP § 2144.03(A), Official Notice, without supporting references, should only be asserted when the subjects asserted to be common knowledge are "capable of instant and unquestionable demonstration as being well-known." That is, the subjects asserted must be of "notorious character" under MPEP § 2144.03(A).

However, the Applicant respectfully submits that the subject matter of the Examiner's assertion of Official Notice is not well-known in the art as evidenced by the searched and cited prior art. The Applicant respectfully submits that the Examiner has performed "a thorough search of the prior art," as part of the Examiner's obligation in examining the present application under MPEP § 904.02.

Additionally, the Applicant respectfully submits that the Examiner's searched and cited references found during the Examiner's thorough and detailed search of the prior art are indicative of the knowledge commonly held in the art. However, in the Examiner's thorough and detailed search of the relevant prior art, none of the prior art taught or suggested the subject matter of the Examiner's assertion of Official Notice. The Applicant respectfully submits that if the subject matter of the Examiner's assertion of Official Notice had been of "notorious character" and "capable of instant and unquestionable demonstration as being well-known" under MPEP § 2144.03(a), then the subject matter would have appeared to the Examiner during the Examiner's thorough and detailed search of the prior art.

If the Examiner had found any teaching of relevant subject matter, the Examiner would have been obligated to list the references teaching the relevant subject matter and make a rejection. Consequently, the Applicant respectfully submits that the prior art does not teach the subject matter of the Examiner's assertion of Official Notice and respectfully traverses the Examiner's assertion of Official Notice.

In addition, the Examiner has not made any showing that the subject matter of the Examiner's assertion of Official Notice was well-known in the art at the time the invention was made, as required under MPEP § 2141.01(III). Specifically, MPEP § 2141.01(III) specifically states that the content of the prior art is determined at the time the invention was made in order to avoid impermissible hindsight. MPEP § 2141.01(III) states that "It is difficult but necessary that the decisionmaker forget what he or she has been taught . . . about the claimed invention and cast the mind back to the time the invention was made (often as here many years)." Consequently, the Examiner must establish that the subject matter of the Examiner's assertion of Official notice was well-known in the art when the present invention was made, rather than that the subject matter is well-known at the present time, in order to comply with MPEP § 2141.01(III) and avoid the use of impermissible hindsight. The Applicant respectfully submits that even if the subject matter of the Examiner's assertion of Official Notice is presently well-known, the Examiner has presented no evidence that the subject matter was well-known at the time that the present invention was made.

The Applicant specifically challenges the Examiner's assertion of Official Notice with regard to the following:

"Although Chiao '869 fails to disclose or fairly suggest use of lateral filtering on the echo signals, Chiao '869 teaches a method wherein finite impulse response (FIR) was applied for filtering (See Col. 5, line 31-36), therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made

to perform the method of averaging the echo signals and higher order finite impulse response (FIR), by lateral filtering, in order to improve the method and apparatus of ultrasounds imagining wherein the signal to noise ration (SNR) is reduced.”

As stated above, the Applicant respectfully traverses the Examiner’s assertions of Official Notice and submits that the subject matter is not of such “notorious character” that it is “capable of instant and unquestionable demonstration as being well-known.” More particularly, the Applicant respectfully assert that a discussion in Chiao ‘869 of using an FIR for filtering does not make it obvious to one of ordinary skill in the art to perform the method of averaging the echo signals and higher order FIR by lateral filtering in order to improve ultrasound imagining wherein the SNR is reduced. Under MPEP 2144.03, the Examiner is now obligated to provide a reference(s) in support of the assertion of Official Notice if the Examiner intends to maintain any rejection based on the assertion of Official Notice. Additionally, the Applicant respectfully requests the Examiner reconsider the assertion of Official Notice and provide to Applicant any basis for the Examiner’s assertion of Official Notice. If the Examiner has any questions, the Examiner is invited and encouraged to contact the Applicant at the number below for further discussion.

CONCLUSION

If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited and encouraged to contact the Applicant at the number below.

The Commissioner is authorized to charge any additional fees or credit overpayment to the Deposit Account of GEMS-IT, Account No. 50-2401.

Respectfully submitted,

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